EXHIBIT 15 (Part 2)

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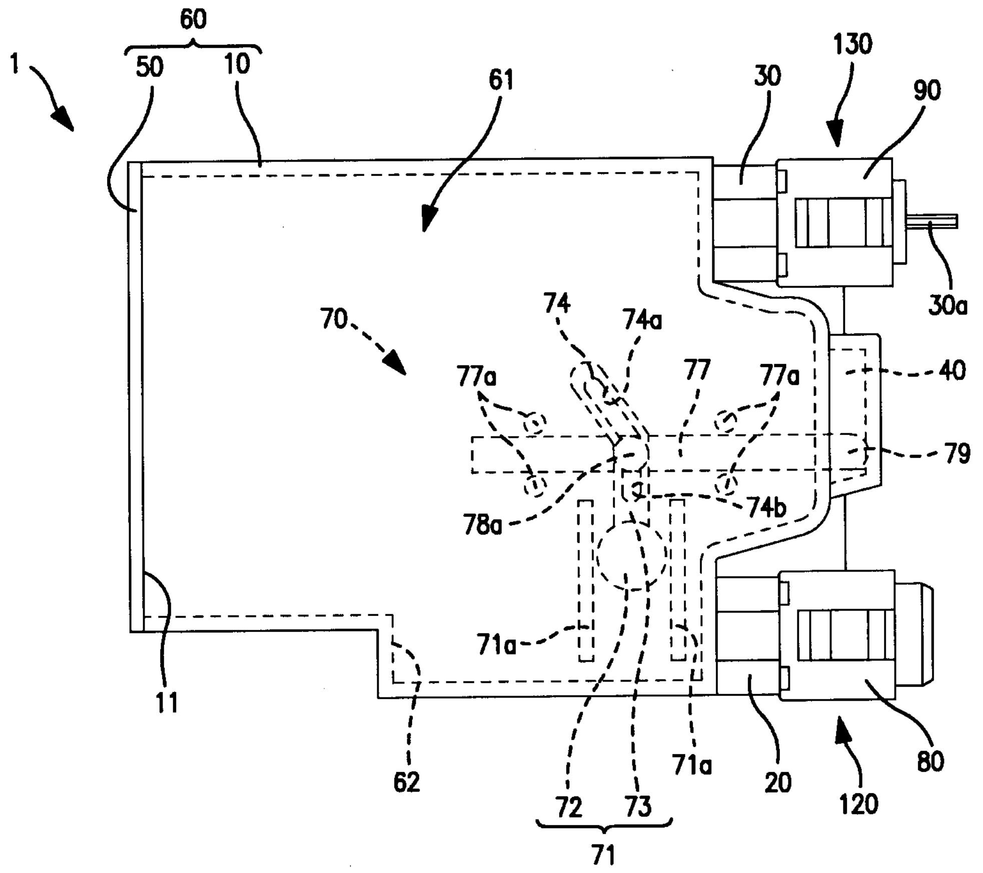
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1
50
10
61
30
130
90
30a
70
74
74a
77a
77
77a
40
79
78a
74b
71a
11
62
72
73
71a
20
120
80
71

FIGURE 2

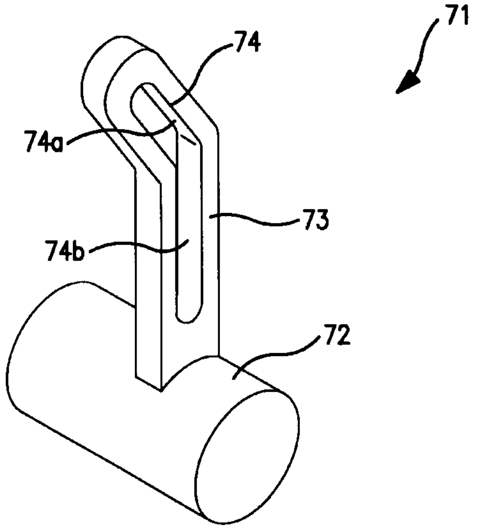

71
74
74a
73
74b
72

FIGURE 3(a)

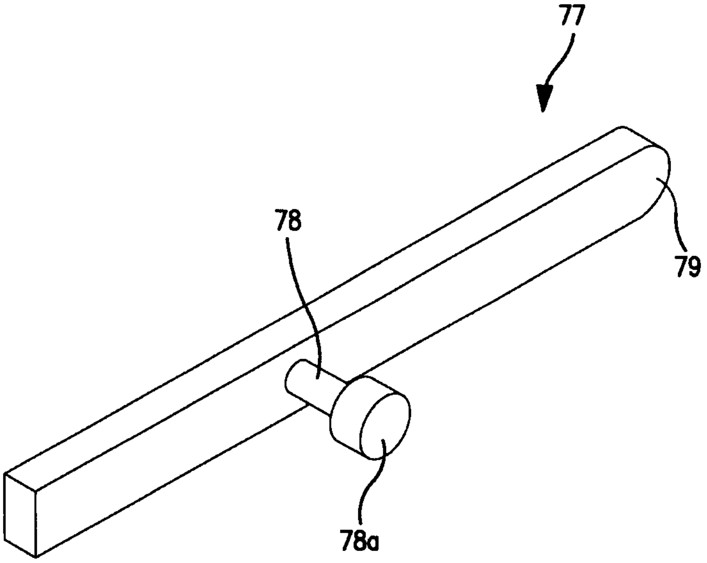


FIGURE 3(b)

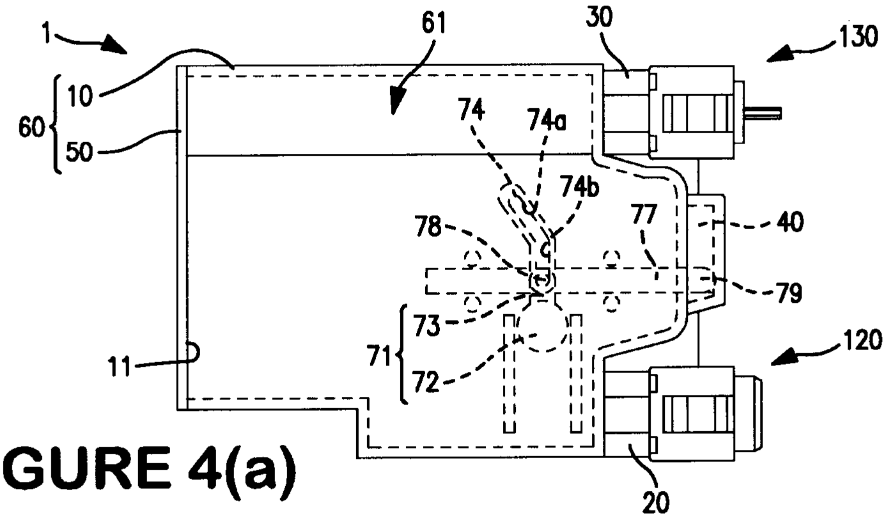

1
61
30
130
10
60
50
74
74a
74b
78
77
40
79
73
71
72
11
120
20

FIGURE 4(a)

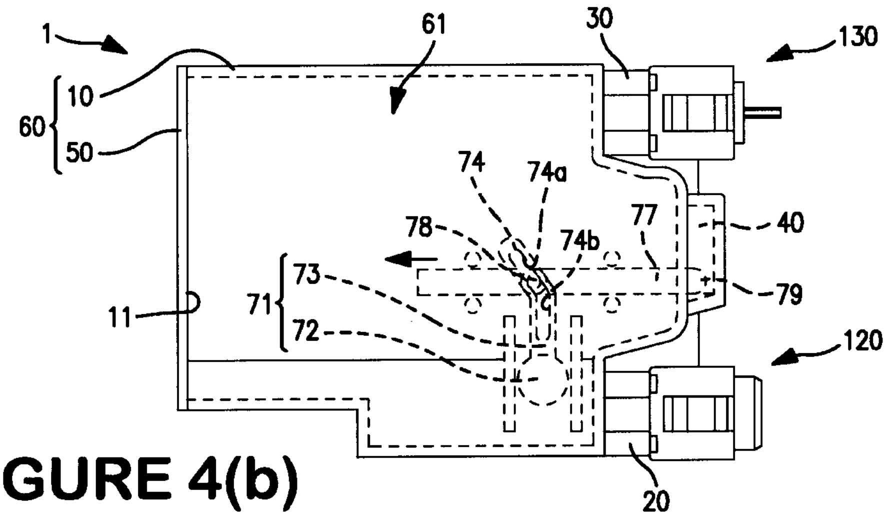

1
61
30
130
10
60
50
74
74a
78
74b
77
40
73
71
72
79
11
120
20

FIGURE 4(b)

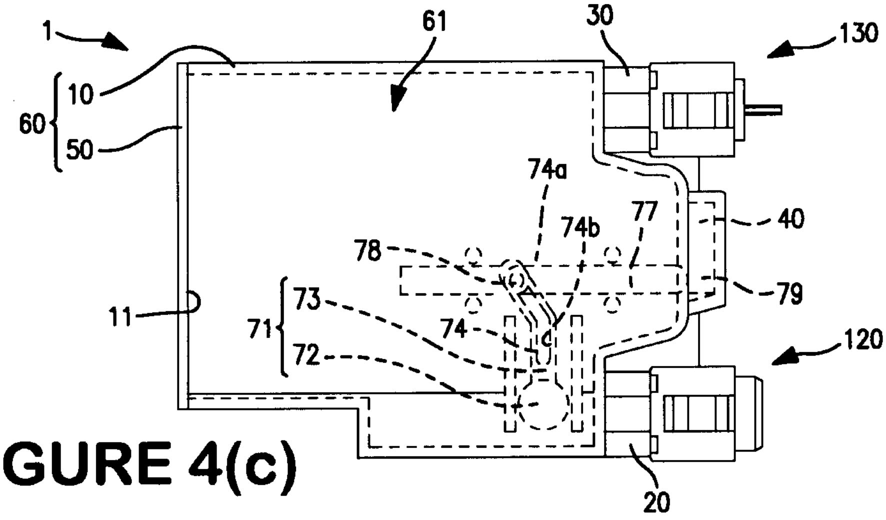
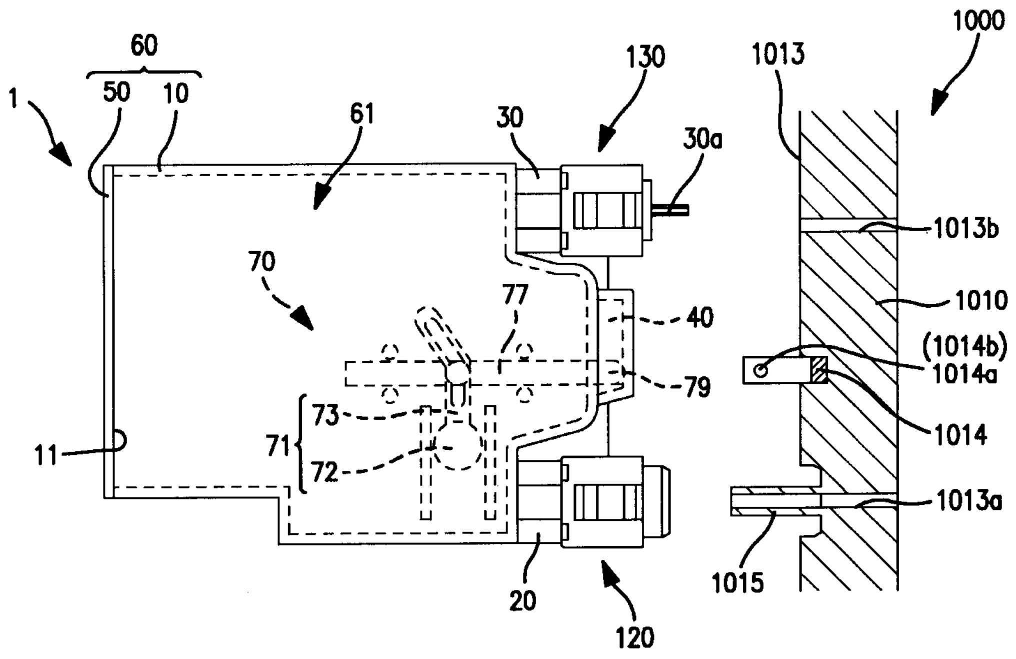

1
61
30
130
10
60
50
74a
74b
77
40
78
79
73
11
71
74
72
120
20

FIGURE 4(c)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50
10
1
61
30
130
30a
1013
1000
1013b
1010
70
77
40
(1014b)
1014a
79
73
71
72
11
1014
1013a
1015
20
120

FIGURE 5(a)

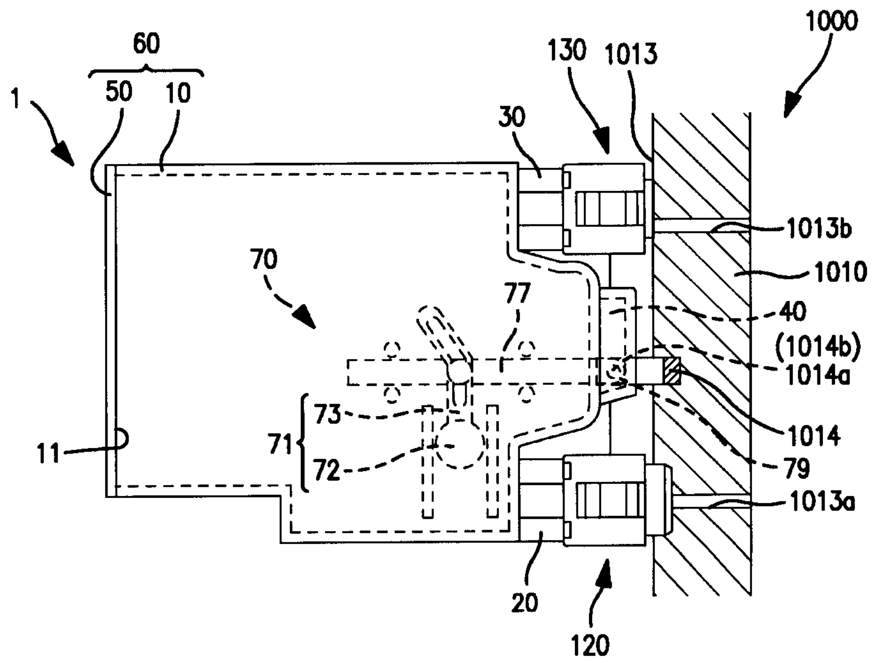
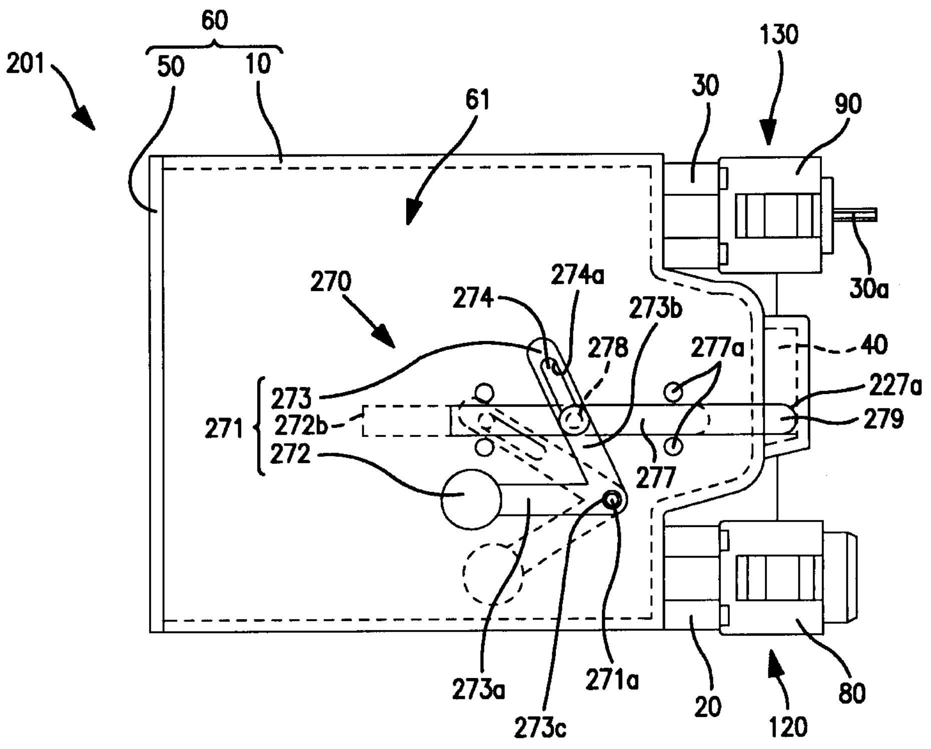

60
50
10
1
130
1013
1000
30
1013b
1010
70
77
40
(1014b)
1014a
73
71
72
11
1014
79
1013a
20
120

FIGURE 5(b)



201
60
50
10
61
30
130
90
30a
270
274a
274
273b
278
277a
40
273
271
272b
272
227a
279
277
273a
273c
271a
20
120
80

FIGURE 6

PATENT
Attorney Docket No. 076376.0411

INK CARTRIDGES

ABSTRACT OF THE DISCLOSURE

An ink cartridge includes a movable member which includes a sliding member and a float portion. The sliding member includes a signal blocking portion, and the signal blocking portion is configured to move in a first direction from a first position within a translucent portion to a second position based on the amount of ink within the ink chamber. Moreover, the float portion is operationally coupled to the sliding member, and the float portion is disposed within the ink chamber. The float portion is configured to move independent of the first portion in a second direction from a third position to a fourth position based on the amount of ink within the ink chamber. For example, the second direction may be substantially perpendicular to the first direction or may be slanted with respect to the first direction.

PATENT
Attorney Docket No. 076376.0411

INK CARTRIDGES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority from Japanese Patent Application No. JP-2006-097842, which was filed on March 31, 2006, and U.S. Provisional Patent Application No. 60/826,254, which was filed on September 20, 2006, the disclosures of which are incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates generally to ink cartridges. In particular, the present invention is directed towards ink cartridges which may be used in combination with printers.

2. Description of Related Art

[0003] Ink cartridges which are configured to be used in combination with ink jet printers are known in the art. In such known ink cartridges it is possible to detect when the amount of ink in the ink cartridge is relatively low. For example, one known ink cartridge comprises a movable member which is pivotally supported inside an ink reservoir. The movable member has a blocking portion at one end and a float portion at the other end. When the ink chamber is filled with ink, the rotation of the movable member due to the rising of the float portion in the vertical direction is restricted by a stopper, such that the blocking portion is positioned at the blocking position, where the blocking portion blocks light emitted from a sensor provided in a printer. When the surface level of the ink is lowered, the position of the float in the vertical direction also is lowered, and the position of the blocking portion in the vertical direction rises, thereby moving the blocking portion from the blocking position to a non-blocking position. Thus, the printer then may determine that the ink cartridge includes substantially no ink, and the ink cartridge needs to be replaced.

SUMMARY OF THE INVENTION

[0004] A need has arisen for ink cartridges which overcome shortcomings of the related art. A technical advantage of the present invention is that a printer may determine that the ink cartridge includes substantially no ink without increasing the width of the ink cartridge.

[0005] According to an embodiment of the present invention, an ink cartridge comprises an ink chamber comprising a wall having a first end and a second end opposite the first end, and a translucent portion positioned at the wall. The translucent portion is configured to be in fluid communication with the ink chamber, and the translucent portion has an inner space formed therein. The ink cartridge also comprises a movable member comprising a sliding member and a float portion. The sliding member comprises a signal blocking portion, and the signal blocking portion is configured to move in a first direction from a first position within the translucent portion to a second position based on the amount of ink within the ink chamber. The float portion is operationally coupled to the sliding member, and the float portion is disposed within the ink chamber. Moreover, the float portion is configured to move independent of the sliding member in a second direction from a third position to a fourth position based on the amount of ink within the ink chamber. For example, the second direction may be substantially perpendicular to the first direction or may be slanted with respect to the first direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] For a more complete understanding of the present invention, the needs satisfied thereby, and the features and technical advantages thereof, reference now is made to the following descriptions taken in connection with the accompanying drawings.

[0007] Figure 1 a perspective view of an ink cartridge, according to an embodiment of the present invention.

[0008] Figure 2 is side view of the ink cartridge of Figure 1.

[0009] Figures 3(a) and 3(b) are diagrams of an guide component and a slide member, respectively, of the ink cartridge of Figure 1.

[0010] Figures 4(a)-4(c) are diagrams depicting a method of detecting an amount of ink within an ink chamber of the ink cartridge of Figure 1.

[0011] Figures 5(a) and 5(b) are diagrams depicting a method installing the ink cartridge of Figure 1 into a printer.

[0012] Figure 6 is a diagram of an ink cartridge, according to another embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0013] Embodiments of the present invention and their features and technical advantages may be understood by referring to Figures 1-6, like numerals being used for like corresponding portions in the various drawings.

[0014] Referring to Figure 1, an ink cartridge 1 may comprise a main body 10 which may have a shallow box shape and may have a bottom with a main opening 11, and a lid 50 which may be configured to close main opening 11 of main body 10. Main body 10 and lid 50 may form a case 60, e.g., a case having a truncated rectangular shape. Ink cartridge 1 also may comprise an ink chamber 61 which may be positioned within case 60 and may store ink therein, and a movable member 70 which may be positioned within ink chamber 61. Main body 10 and lid 50 may comprise a resin material, e.g., polypropylene, and may be manufactured using an injection molding. Moreover, ink cartridge 1 may comprise an ink supply portion 120 for supplying ink from an interior of ink chamber 61 to an exterior of ink chamber 61, and an air intake portion 130 for drawing air into ink chamber 61. Ink supply portion 120 and air intake portion 130 may be formed on the same side surface.

[0015] An ink outlet 20 may be formed on the bottom side of wall which faces main opening 11, which may be connected to ink chamber 61, and an air connection path 30 may be formed on the top side, which may be connected to ink chamber 61. Ink outlet 20 and air connection path 30 each may have a tube shape which extends along the longitudinal direction, and a portion of an ink supply mechanism 80 may be inserted within ink outlet 20. Moreover, a portion of an air intake mechanism 90 may be inserted within air connection path 30.

[0016] Ink supply mechanism 80 may be configured to close the ink path when ink cartridge 1 is not installed in printer 1000, and to open the ink path when ink cartridge 1 is installed in printer 1000. Therefore, ink supply portion 120 may supply ink from ink chamber 61 to printer 1000 when ink cartridge 1 is installed in printer 1000.

[0017] Air intake mechanism 90 may have a valve opening portion 30a which protrudes towards the outside of air connection path 30 when a portion of it is enclosed within air connection portion 30. Air intake mechanism 90 may be configured to close air connection path 30 when ink cartridge 1 is not installed in printer 1000, and to open air connection path 30 when ink cartridge 1 is installed in printer 1000. Valve opening portion 30a may contact installation surface 1013 of printer 1000, and air connection path 30 may be opened. Therefore, air intake portion 130 may be connected with the inside of ink chamber 61 when ink cartridge 1 is installed in printer 1000.

[0018] Moreover, a translucent portion 40 may protrude towards the outside of ink cartridge 1 between ink outlet 20 and air connection path 30, and translucent portion 40 may have an inner spaced formed therein. The length along the width direction of translucent portion

40 may be less than the length in the width direction of ink cartridge 1. Referring to Figures 5(a) and 5(b), translucent portion 40 may be positioned between a light emitting portion 1014a and a light receiving portion 1014b of a sensor 1014 of printer 1000 when ink cartridge 1 is installed in printer 1000.

[0019] Referring to Figures 1-3(b), a guide component 71 may comprise a resin, e.g., a styrene resin, having a specific gravity which is less than the specific gravity of ink. Guide component 71 may comprise a round pillar-shaped float portion 72 which extends along the width direction of ink cartridge 1, and an extender portion 73 which extends from float portion 72 and further extends at an angle away from translucent portion 40. The volume of float portion 72 may be substantially greater than the volume of extender portion 73. Moreover, the volume ratio of float portion 72 in guide component 71 may be selected, such that when float portion 72 is positioned within the ink, the buoyancy generated in guide component 71 is greater than gravity, and such that when one portion of float portion 72 is exposed from the ink, the buoyancy generated in guide component 71 is about equal to gravity.

[0020] Referring to Figure 3(a), an opening 74, e.g., a guide path, may be formed within extender portion 73, and opening 74 may have substantially the same shape as the outer shape of extender portion 73. A sloped surface 74a and a vertical surface 74b may be formed on one side of the pair of opposing surfaces which defines opening 74 and extend along the extension direction of opening 74. Each of sloped surface 74a and vertical surface 74b may be a surface contributing to moving slide member 77. For example, float portion 72 may be operationally coupled to slide member 77 via extender portion 73.

[0021] Referring to Figure 1 and 2, a control component 71a may comprise a pair of plate-shaped components which extend in parallel along the vertical direction and are spaced in the longitudinal direction of case 60. The pair of plate-shaped components may be arranged, such that they connect the space between the pair of side walls which have the maximum area of case 60. Further, float portion 72 may be positioned between the pair of control components 71a. For example, the spacing of the pair of control components 71a may be slightly wider than the diameter of float portion 72, and therefore, float portion 72 may be smoothly displaced in vertical direction between the pair of control components 71a. Referring to Figure 2, because there may be a space formed between the lower edge portion of control component 71a and case 60, ink within ink chamber 61 may smoothly move towards ink supply portion 120 through the space.

[0022] Slide member 77 may comprise a rod-shaped component which extends in the longitudinal direction. Slide member 77 may have light-blocking properties, and may be supported, such that it may move along the extension direction at a predetermined height level. A pin 78 may extend from the central portion in longitudinal direction of slide member 77, which may be inserted into opening 74. A stopper 78a may be formed at an edge portion of pin 78, and stopper 78a may be wider than opening 74, such that pin 78 does not fall out of opening 74.

[0023] Moreover, slide member 77 may comprise a blocking portion 79 which may be selectively positioned within the inner space of translucent portion 40, and the presence of blocking portion 79 within the inner space of translucent portion 40 may be detected by sensor a 1014 of printer 1000. For example, when pin 78 is in contact with vertical surface 74b within opening 74, blocking portion 79 may be positioned within translucent portion 40, and when pin 78 is in contact with the edge portion of sloped surface 74a within opening 74, blocking portion 79 may be positioned outside of the inner space of translucent portion 40.

[0024] Slide member 77 may comprise a plurality, e.g., four, rod-shaped member that connect the pair of side walls having the maximum area of case 60. The spacing of the pair of support members 77a which are adjacent in vertical direction may be slightly larger than the length in vertical direction of slide member 77, and therefore, slide member 77 may smoothly slide between the pair of support members 77a.

[0025] Referring to Figure 4(a), when the ink stored within ink chamber 61 is sufficient, the buoyancy generated in guide component 71 is greater than gravity, such that guide component 71 receives a force that is directed upwards. As a result, pin 78 of slide member 77 contacts the edge portion of vertical surface 74b. Therefore, blocking portion 79 is positioned at within translucent portion 40. At this time, the space between light emitting portion 1014a and light receiving portion 1014b of sensor 1014 of printer 1000 is blocked by blocking portion 79, and a determination that there is ink remaining may be made by a control substrate (not shown) of printer 1000.

[0026] When the level of the ink within ink chamber 61 drops, and one portion of float portion 72 is exposed from the ink surface, the buoyancy generated in guide component 71 is about equal to gravity. When the ink level drops even further, guide component 71 is displaced downwards along with the reduction in the ink level. While guide component 71 falls from position shown in Figure 4(a), pin 78 of slide member 77 contacts vertical surface 74b along the vertical direction. At this time, slide member 77 will not move, and blocking portion 79 will be positioned within translucent portion 40. Therefore, the space between light emitting portion 1014a and light receiving portion 1014b of sensor 1014 is blocked, and determination will be made by the control substrate in printer that there is still ink remaining.

[0027] Referring to Figure 4(b), when the amount of ink remaining within ink chamber 61 is reduced, and guide component 71 has fallen to a position in which pin 78 of slide member 77 contacts sloped surface 74a, pin 78 is guided away from translucent portion 40 by sloped surface 74a, and slide member 77 slides to the opposite side to translucent portion 40, e.g., to a position outside of the inner space of translucent portion 40, independent of the movement of guide component 71, e.g., independent of the movement of float portion 72 of guide component 71. For example, slide member 77 may move in a direction which is substantially perpendicular to the direction of movement of float portion 72.

[0028] Then, referring to Figure 4(c), when guide component 71 has fallen to a position in which pin 78 of slide member 77 contacts the edge portion of sloped surface 74a, blocking portion 79 is displaced outside the inner space of translucent portion 40. At this time, light may pass between light emitting portion 1014a and light receiving portion 1014b of sensor 1014, and determination may be made by the control substrate that there is substantially no ink remaining within ink chamber 61.

[0029] Referring to Figure 5(a), sensor 1014 may be formed on an attachment portion 1010 into which ink cartridge 1 may be attached in printer 1000. Sensor 1014 may have a truncated U-shape, and one edge portion of the opened U-shape may comprise light emitting portion 1014a, and the other edge portion may comprise light receiving portion 1014b. Light emitting portion 1014a and light receiving portion 1014b may protrude from an attachment surface 1013. In operation, sensor 1014 may not emit a signal to the control substrate when the light emitted from light emitting portion 1014a is received by light receiving portion 1014b, and sensor 1014 may emit a signal to the control substrate when the light emitted from light emitting portion 1014a is blocked by blocking portion 79, or vice versa.

[0030] Moreover, an ink extraction pipe 1015 may protrude on the side opposing ink supply portion 120, and the attachment surface 1013 may be a flat surface. An ink path 1013a may be connected to ink extraction pipe 1015, and ink may be supplied to a discharge outlet (not shown) via ink path 1013a. An air intake path 1013b may be formed in attachment surface 1013, and air may be drawn into ink chamber 61 via air intake path 1013b.

[0031] Referring to Figure 5(b), when ink cartridge 1 is installed in attachment portion 1010, air may be drawn in as valve opening portion 30a of air intake portion 130 comes into contact with attachment surface 1013, and detection portion 40 becomes positioned between light emitting portion 1014a and light receiving portion 1014b, which allows for the detection of the amount of ink remaining within ink chamber 61.

[0032] Referring to Figure 6, in another embodiment of the present invention, an ink cartridge 201 is depicted. Ink cartridge 1 is substantially similar to ink cartridge 1, except that movable member 70 of ink cartridge 1 is replaced by movable member 270. Therefore, only the differences between ink cartridge 270 and ink cartridge 1 are discussed with respect to ink cartridge 270.

[0033] In this embodiment of the present invention, movable member 270 may comprise an guide component 271, a control component 271a to control the displacement of guide component 271, a slide member 277, and a support member 277a to support slide member 277.

[0034] Guide component 271 may comprise a resin material, e.g., a styrene resin, which has a specific gravity which is less than the specific gravity of ink. Guide component 271 may comprise an extender portion 273 having a bent shape and which opens in a direction away from translucent portion 40. Extender portion 273 may comprise a first arm 273a which extends in a first direction, and a second arm 273b which extends in a second direction and which is connected to the edge portion of first arm 273a, such that an acute angle is formed between first arm 273a and second arm 273b. Guide component 271 also may comprise a round, pillar-shaped float portion 272 which is connected to an end of first arm 273a.

[0035] A through-hole 273c may be connected to control component 271a which may be located within the bent portion of extender portion 273. Control component 271a may comprise a rod-shaped member which connects the pair of side walls having the maximum area of case 60, and which extend in the horizontal direction. The diameter of control component 271 may be less than the diameter of through-hole 273c. Therefore, guide component 271 may smoothly rotate about the bent portion of extender portion 273.

[0036] The volume of float portion 272 may be larger than the volume of extender portion 273. Moreover, the volume ratio between extender portion 273 and float portion 272 may be selected, such that when float portion 272 is positioned within the ink, the clockwise moment that is generated in guide component 271 by gravity and buoyancy is greater than the counterclockwise moment in Figure 6, and when one portion of float portion 272 is exposed from the ink, the buoyancy generated in float portion 272 is reduced, and the clockwise moment and the counterclockwise moment are substantially equal. Therefore, after one portion of float portion 272 is exposed from the ink, if the ink level drops further due to a reduction in ink, float portion 272 moves downward on the surface of the ink. When float portion 272 moves downward, guide component 271 rotates using the bent portion of extender portion 273 as its axis of rotation.

[0037] Moreover, an opening 274 may be formed along the extender direction of second arm 273b. Opening 274 may have a sloped surface 274a which contributes to moving slide member 277. Sloped surface 274a may be a flat surface which extends in a direction which is sloped with respect to the horizontal direction.

[0038] Slide member 277 may comprise a signal blocking end 277a and a non-signal blocking end 277b, and may be supported, such that it may move along the extender direction at a predetermined height level similar to slide member 77. A pin 278 of slide member 277 may be inserted into opening 274. In present embodiment, when first arm 273a is horizontal, pin 278 may contact the lower edge of sloped surface 274a.

[0039] A blocking portion 279 of slide member 277 may comprise blocking end 277a and may be positioned within translucent portion 40 when pin 278 is in contact with the lower edge portion of sloped surface 274a, and when pin 278 is in contact with the upper edge portion of sloped surface 274a, blocking portion 279 may be positioned outside of translucent portion 40 and within ink chamber 61.

[0040] Therefore, in ink cartridge 201, when there is a sufficient amount of ink stored within ink chamber 61, because the clockwise moment generated in guide component 271 is greater than the counterclockwise moment, guide component 71 will receive a force in the clockwise direction. As a result, the space between light emitting portion 1014a and light receiving portion 1014b will be blocked, and a the control substrate of printer 1000 may determine that there is ink remaining within ink chamber 61.

[0041] As the ink level drops according to a reduction in the amount of ink remaining within ink chamber 61, a portion of float portion 272 may be exposed from the ink surface, and the clockwise moment generated in guide component 271 may be about the same as the counterclockwise moment. Then, as the ink surface drops further, float portion 272 may be displaced downwards due to the drop in the ink level, and extender portion 273 may rotate counterclockwise about the bent portion. Therefore, pin 278 may be guided towards away from translucent portion 40 by sloped surface 274a, and slide member 277 may slide in opposite direction to that of translucent portion 40. At this time, light may pass between light emitting portion 1014a and light receiving portion 1014b, such that the control substrate of printer 1000 may determine that there is substantially no ink remaining within ink chamber 61. For example, as the ink level drops according to a reduction in the amount of ink remaining within ink chamber 61, movable member 270 may move, such that a distance between float portion 272 and signal blocking end 277a decreases and a distance between float portion 272 and non-signal blocking end 277b increases.

[0042] While the invention has been described in connection with exemplary embodiments, it will be understood by those skilled in art that other variations and modifications of the exemplary embodiments described above may be made without departing from the scope of invention. Other embodiments will be apparent to those skilled in art from a consideration of the specification or practice of the invention disclosed herein. It is intended that specification and described examples are considered merely as exemplary of invention, with the true scope of the invention being indicated by the flowing claims.

Electronic Acknowledgement Receipt

EFS ID:	1226196
Application Number:	11536665
Confirmation Number:	9344
Title of Invention:	Ink Cartridges
First Named Inventor:	Toyonori Sasaki
Customer Number:	24735
Filer:	Timothy Jay Churna
Filer Authorized By:	
Attorney Docket Number:	076376.0411
Receipt Date:	29-SEP-2006
Filing Date:	
Time Stamp:	01:14:23
Application Type:	Utility
International Application Number:	

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$1130
RAM confirmation Number	948
Deposit Account	020375

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part	Pages

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Warnings:					
Information:					
2	Specification	Specification0411.pdf	706140	no	13
Warnings:					
Information:					
3	Claims	Claims0411.pdf	156715	no	4
Warnings:					
Information:					
4	Abstract	Abstract0411.pdf	30281	no	1
Warnings:					
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5	Drawings	drawings0411.pdf	264294	no	6
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6	Application Data Sheet	US_ADS_Form_SB_14.pdf	1030498	no	4
Warnings:					
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7	Oath or Declaration filed	dec0411.pdf	275223	no	3
Warnings:					
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8	Petition for 12-month Accelerated Exam	sb0028_fill.pdf	761549	no	4
Warnings:					
Information:					
9	Statement of preexamination search	search0411.pdf	220685	no	7
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10	Examination support document	aesd0411.pdf	909480	no	21
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11	Information Disclosure Statement (IDS) Filed	US_IDS_Form__SB_08a.pdf	696073	no	4
Warnings:					
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12	Foreign Reference	jp8281966.pdf	983183	no	10
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13	Fee Worksheet (PTO-875)	fee-info.pdf	8436	no	2
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		Total Files Size (in bytes):	6177957		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

Doc Code: PET.SPRE.ACX

PTO/SB/28 (08-06)
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U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

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PETITION TO MAKE SPECIAL UNDER ACCELERATED EXAMINATION PROGRAM

Attorney Docket Number		First Named Inventor	
Application Number (if Known)			
Title of Invention			

APPLICANT HEREBY PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE REVISED ACCELERATED EXAMINATION PROGRAM. See Instruction sheet on page 3.

1. **Claims of the application:**

a. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims.

b. **Applicant hereby agrees not to separately argue the patentability of any dependent claim during any appeal** in the application. Specifically, the applicant agrees that the dependent claims will be grouped together with and not argued separately from the independent claim from which they depend in any appeal brief filed in the application (37 CFR 41.37(c)(1)(vii)).

c. The claims must be directed to **a single invention.**

2. **Interviews:**

Applicant hereby agrees to have (if requested by examiner):

a. An interview (including an interview before a first Office action) to discuss the prior art and any potential rejections or objections with the intention of clarifying and possibly resolving all issues with respect to patentability at that time, and

b. A telephonic interview to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention.

3. **Preexamination Search Statement and Accelerated Examination Support Document:**

With this petition, applicant is providing: a **preexamination search statement**, in compliance with the requirements set forth in item 8 of the instruction sheet, and an **"accelerated examination support document"** that includes:

a. An **information disclosure statement** in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the independent claims;

b. For each reference cited, **an identification of all the limitations of the claims** that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;

c. A **detailed explanation of how each of the claims are patentable** over the references cited with the particularity required by 37 CFR 1.111(b) and (c);

d. A concise **statement of the utility** of the invention as defined in each of the independent claims (unless the application is a design application);

e. An identification of any cited references that may be disqualified as prior art under 35 U.S.C. 103(c) as amended by the CREATE act; and

f. **A showing of where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112** in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6; and (2) the structure, material, or acts that correspond to any means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6. If the application claims the benefit of one or more applications under title 35, United St ates Code, the showing must also include where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112 in each such application in which such support exists.

The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This form is estimated to take 12 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. *If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

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PETITION TO MAKE SPECIAL UNDER ACCELERATED EXAMINATION PROGRAM (Continued)

Attorney Docket Number		First Named Inventor	

Attachments:

a.		Accelerated Examination Support Document (see item 3 above).
b.		A statement, in compliance with the requirements set forth in item 8 of the instruction sheet, detailing the preexamination search which was conducted.
c.		Information Disclosure Statement.
d.	☐	Other (*e.g.*, a statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism (37 CFR 1.102(c)(2)) ________

Fees: The following fees must be filed electronically via EFS or EFS-Web:

a.	The basic filing fee, search fee, examination fee, and application size fee (if required) under 37 CFR 1.16.
b.	Petition fee under 37 CFR 1.17(h) - unless the petition is filed with a showing under 37 CFR 1.102(c)(2).

Signature:

Click Remove if you wish to remove this signatory — Remove

Signature		Date	
Name (Print/Typed)		Registration Number	

Click Add if you wish to add additional signatory — Add

***Note**: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.*

PTO/SB/28 (08-06)
Approved for use through 09/30/2006. OMB 0651-0031
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Instruction Sheet Petition to Make Special Under the Accelerated Examination

A grantable petition must meet the following conditions:

1. The petition to make special under the accelerated examination program must be filed with the application and accompanied by the fee set forth in 37 CFR 1.17(h) or a statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism.

2. The application must be a non-reissue utility or design application filed under 35 U.S.C. 111(a).

3. The application must be **filed electronically** using the Office electronic filing system (EFS) or EFS-Web.

4. The application must be complete under 37 CFR 1.51 and in condition for examination on filing. For example, the application must be filed together with the basic filing fee, search fee, examination fee, and application size fee (if applicable), and an oath or declaration under 37 CFR 1.63.

5. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims. The petition must include a statement that **applicant will agree not to separately argue the patentability of any dependent claim during any appeal** in the application. Specifically, the applicant is agreeing that the dependent claims will be grouped together with and not argued separately from the independent claim from which they depend in any appeal brief filed in the application (37 CFR 41.37(c)(1)(vii)).

6. The claims must be directed to a **single invention**. The petition must include a statement that applicant will agree to have a telephonic interview to make an election without traverse in a telephonic interview if the Office determines that all the claims are not directed to a single invention.

7. The petition must include a statement that **applicant will agree** to have an interview (including an interview before a first Office action) to discuss the prior art and any potential rejections or objections with the intention of clarifying and possibly resolving all issues with respect to patentability at that time.

8. At the time of filing, applicant must provide a statement that a **preexamination search was conducted**, including an identification of the field of search by United States class and subclass and the date of the search, where applicable, and, for database searches, the search logic or chemical structure or sequence used as a query, the name of the file or files searched and the database service, and the date of the search.
   a. This preexamination search must involve U.S. patents and patent application publications, foreign patent documents, and nonpatent literature, unless the applicant can justify with reasonable certainty that no references more pertinent than those already identified are likely to be found in the eliminated source and includes such a justification with this statement.
   b. This preexamination search must be directed to the claimed invention and encompass all of the features of the independent claims, giving the claims the broadest reasonable interpretation.
   c. The preexamination search must also encompass the disclosed features that may be claimed, in that an amendment to the claims (including any new claim) that is not encompassed by the preexamination search will be treated as non-responsive and will not be entered.
   d. A search report from a foreign patent office will not be accepted unless the search report satisfies the requirements set forth above.
   e. Any statement in support of a petition to make special must be based on a good faith belief that the preexamination search was conducted in compliance with these requirement. See 37 CFR 1.56 and 10.18.

9. At the time of filing, applicant must provide in support of the petition an **accelerated examination support document that includes:**
   a. An **information disclosure statement** in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the claims;
   b. For each reference cited, **an identification of all the limitations of the claims** that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;
   c. A **detailed explanation of how each of the claims are patentable** over the references cited with the particularity required by 37 CFR 1.111(b) and (c);
   d. A concise **statement of the utility** of the invention as defined in each of the independent claims (unless the application is a design application);
   e. An identification of any cited references that may be disqualified as prior art under 35 U.S.C. 103(c) as am ende d by the CREATE act; and
   f. A **showing of where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112** in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6; and (2) the structure, material, or acts that correspond to any means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6. If the application claims the benefit of one or more applications under title 35, United States Code, the showing must also include where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112 in each such application in which such support exists.

For more information, see notice "Changes to Practice for Petitions in Patent Applications to Make Special and for Accelerated Examination" available on the USPTO web site at http://www.uspto.gov/web/office s/pac/dapp/ogsheet.html

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Fr eedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about indivi duals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INK JET RECORDER AND RESIDUAL INK DETECTING METHOD

特許公報番号	JP8281966
公報発行日	1996-10-29
発明者:	KAYAHARA TAMIO
出願人	MATSUSHITA ELECTRIC IND CO LTD
分類:	
一国際:	*B41J2/175;* B41J2/175; (IPC1-7): B41J2/175; G01F23/292
一欧州:	
出願番号	JP19950088104 19950413
優先権主張番号:	JP19950088104 19950413

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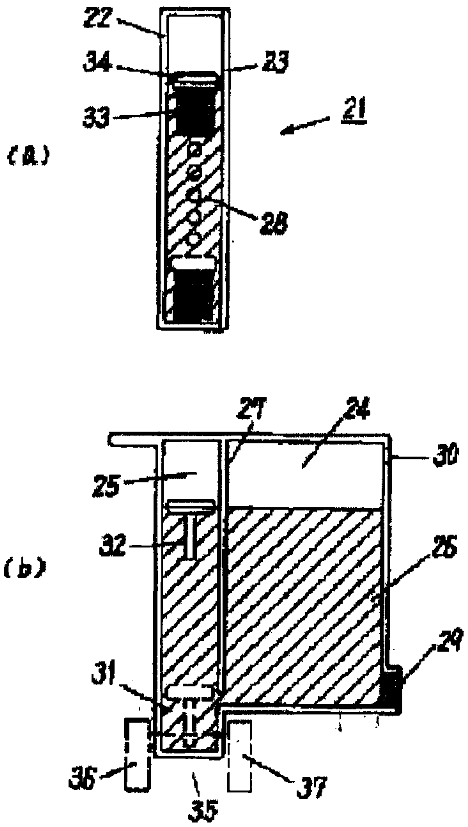
要約 JP8281966

PURPOSE: To provide an ink jet recorder which has excellent reliability and maintainability capable of detecting the lack of ink, and a method for detecting the residual ink. CONSTITUTION: The ink jet recorder comprises a recording head 38 having a discharge port for discharging ink, an ink vessel 21 for containing the ink to be supplied to the head, and a carriage mounting the head and the vessel 21 to linearly move. The recorder further comprises a member 32 to be detected with ink and having a shielding member 33 having light shielding properties and a floating member 34 disposed at the upper part of the member 33 in the vessel 22 and freely floated on the ink, a detecting ink reservoir 31 mounted in a protrusion with the transparent lower part of the vessel 21, and an optical detecting member 35 having a light emitting element 36 and a light receiving element 37 for detecting the light from the element 36. The member 32 shields between the element 36 and the element 37.



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審査請求　未請求　請求項の数8　OL　（全9頁）

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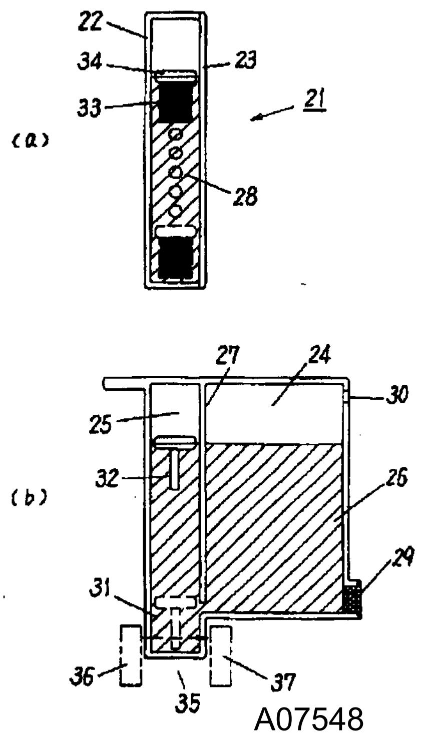
(54)【発明の名称】　インクジェット記録装置及びそのインク残量検知方法

(57)【要約】

【目的】　インク切れの検知可能な信頼性，保全性に優れたインクジェット記録装置及びそのインク残量検知方法を提供することを目的とする。

【構成】　インクを吐出する吐出口を有する記録ヘッド３８と、記録ヘッド３８に供給するインクを収容するインク容器２１と、記録ヘッド３８とインク容器２１を搭載し直線移動するキャリッジと、を備えたインクジェット記録装置であって、インク容器２１内に遮光性を有する遮光部材３３と遮光部材３３の上部に配設された浮動部材３４とからなりインク上を浮動自在であるインク被検知部材３２と、インク容器２１の下部が透明で凸形状に掲載された検知用インク溜部３１と、発光素子３６と発光素子３６からの光を検知する受光素子３７とを有する光学的検知部材３５と、を備え、インク容器２１の下部において、インク被検知部材３２が発光素子３６と受光素子３７の間を遮断する構成をしている。



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【特許請求の範囲】

【請求項１】インクを吐出する吐出口を有する記録ヘッドと、前記記録ヘッドに供給する前記インクを収容するインク容器と、前記記録ヘッドと前記インク容器を搭載し直線移動するキャリッジと、装置全体を制御するメイン制御部と、を備えたインクジェット記録装置であって、前記インク容器内に遮光性を有する遮光部材と前記遮光部材の上部に配設された浮動部材とからなり前記インク上を浮動自在であるインク被検知部材と、前記インク容器の下部が透明で凸形状に形成された検知用インク溜部と、発光素子と前記発光素子からの光を検知する受光素子とを有する光学的検知部材と、を備え、前記検知用インク溜部が前記光学的検知部材の前記発光素子と前記受光素子の間を遮断することを特徴とするインクジェット記録装置。

【請求項２】前記浮動部材が、インク比重より軽い発泡体、又は中空状に形成され、前記インク被検知部材が前記インク上を浮動自在であることを特徴とする請求項１に記載のインクジェット記録装置。

【請求項３】前記インク容器が、垂直方向に分離され少なくとも下部において連通する主インク容器部と検知用インク容器部を備え、前記検知用インク容器部に前記インク被検知部材が挿入され、前記検知用インク容器部の下部に前記検知用インク溜部が形成されていることを特徴とする請求項１又は２に記載のインクジェット記録装置。

【請求項４】前記光学的検知部材が、前記キャリッジの位置指標となるホーム位置検知遮光部材の検知も行うことを特徴とする請求項１乃至３の内いずれか１に記載のインクジェット記録装置。

【請求項５】前記インク容器が着脱自在であることを特徴とする請求項１乃至４の内いずれか１に記載のインクジェット記録装置。

【請求項６】前記メイン制御部が、前記光学的検知部材が前記インク容器のインク切れ又は前記インク切れを予め検知する際に、前記インク切れ又は前記インク切れを予め表示部又は音声出力部に伝達する告知制御部を備えたことを特徴とする請求項１乃至５の内いずれか１に記載のインクジェット記録装置。

【請求項７】前記遮光部材が、下部に遮光性を有する部位と、前記遮光部材の上部に透過性を有する部位又は前記遮光部材の上部に配設された前記浮動部材が透過性を有する部位と、を備えたことを特徴とする請求項１乃至６の内いずれか１に記載のインクジェット記録装置。

【請求項８】前記告知制御部が、前記遮光部材の遮光性を有する前記部位が前記光学的検知部材に検知される位置に下降した際に、前記インク切れの予告を前記表示部又は前記音声出力部により行うインク切れ予告工程と、次に、前記遮光部材の透過性を有する前記部位又は前記遮光部材の上部に配設された透過性を有する前記浮動部材が下降した際に、前記インク切れによる印字動作を停止する印字停止工程を、備えたことを特徴とする請求項７に記載のインクジェット記録装置のインク残量検知方法。

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【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はインクに吐出エネルギーを付与し、記録媒体にインクを付着させて画像の記録を行うインクジェット記録装置及びそのインク残量検知方法に関するものである。

【０００２】

【従来の技術】近年、コンピュータ技術は著しく日々進歩している。特に、オフィスオートメーション化において種々の情報を活字化する役目を担うコンピュータやワードプロセッサー等に接続されるプリンタ，複写機，ファクシミリ等の画像記録装置は、画像情報に基づいて、紙やプラスチック薄板等の被記録材に画像を形成できるように構成されている。この画像記録装置において、低騒音化，高速化，高精細化，低価格化及びカラー化等様々な要求がある。これらの要求に対して、現在、ワイヤードット式，サーマル式，ペンプロット式，レーザービーム式，及びインクジェット式等の記録装置が開発、提供されている。この中で、インクジェット記録装置は高密度な画像を高速で記録することが可能で、ノンインパクト方式であるため、記録騒音が小さい、複数色のインクを使用してカラー画像を記録すること、及び装置の構成が簡単で小型化が容易である等の、多くの特徴を有している。インクジェット記録装置に用いられる記録ヘッドにおけるインクを吐出させる方法として、ピエゾ圧電素子等の電気機械変換体によりインク室の容積を変化させて記録媒体へインクを吐出飛翔させて記録を行うピエゾ方式と、電気熱エネルギ変換体によって発生される熱エネルギによって形成される膜沸騰による気泡の発生，膨張，収縮によって生じる圧力変化を利用して、記録媒体へインクを吐出飛翔させて記録を行う方式がある。特に、最近、インクジェット記録装置は、黒色単色印字の他にカラー印字が主流となりつつある。そのため、印字装置においても複数のインク色に対応した複数個のインク容器及び記録ヘッドを設けている場合がある。しかしながら、この記録ヘッドは、インクがないに等しい状態で駆動していると過電流により、電極が破壊させることがあるため、インクタンク内にインクが残っているかを否かを検知することが必要である。

【０００３】以下に従来のインクジェット記録装置のインク検知方法について説明する。一例として、インク容器中に一対の電極を配置して、インク残量を検知する方法がある。この原理は、一対の電極間の抵抗変化を監視することにより行われる。すなわち、インクの量が少なくなり一定量以下になると、電極間のインクの介在がなくなる。インクはその組成の多くが水であるため、数Ｋ

Ω以下の比較的小さな電気抵抗を示すので、電極の間のインクの有無による抵抗値の変化を監視しておけば、インクの量が残り少ないかどうかを判定できる。

【0004】

【発明が解決しようとする課題】しかしながら上記従来の構成では、各インク容器毎に独立した検知用電極、接続端子及び検知回路を設けなければならず、検知手段が複雑になりコストも嵩むという問題点を有していた。特に、一対の電極に印加する電圧が直流電圧の場合、インクが電気分解を起こしインク容器内にガス又はこのガスによる気泡が発生し、電極によるインク検知の誤動作が生じていた。又、この気泡がインク供給路を通して記録ヘッド内に入ると、インク滴の吐出不良等を起こし、印字品質が劣化するという問題点を有していた。又、電気抵抗が、環境変化及び振動等による外的変化により不安定となり正確な電気抵抗が測定できない。又、検知用電極、接続端子及び検知回路を設ける必要があり、部品点数が増加し、インクジェット記録装置の構成が複雑になるという問題点を有していた。

【0005】本発明は上記従来の問題点を解決するもので、簡単な構成でインク容器内のインク残量の検知又はインク切れの予告可能な信頼性，保全性に優れたインクジェット記録装置、及び、インク切れの予告可能な保全性，利便性に優れたインクジェット記録装置のインク残量検知方法を提供することを目的とする。

【0006】

【課題を解決するための手段】この目的を達成するために本発明の請求項1に記載のインクジェット記録装置は、インクを吐出する吐出口を有する記録ヘッドと、記録ヘッドに供給する前記インクを収容するインク容器と、前記記録ヘッドと前記インク容器を搭載し直線移動するキャリッジと、装置全体を制御するメイン制御部と、を備えたインクジェット記録装置であって、前記インク容器内に遮光性を有する遮光部材と前記遮光部材の上部に配設された浮動部材とからなり前記インク上を浮動自在であるインク被検知部材と、前記インク容器の下部が透明で凸形状に形成された検知用インク溜部と、発光素子と発光素子からの光を検知する受光素子とを有する光学的検知部材と、を備え、検知用インク溜部が前記インク被検知部材が光学的検知部材の発光素子と前記受光素子の間を遮断する構成を有している。

【0007】本発明の請求項2に記載のインクジェット記録装置は、請求項1において、浮動部材が、インク比重より軽い発泡体又は中空状に形成され、インク被検知部材がインク上を浮動自在である構成を有している。

【0008】本発明の請求項3に記載のインクジェット記録装置は、請求項1又は2において、インク容器が、垂直方向に分離され少なくとも下部において連通する主インク容器部と検知用インク容器部を備え、検知用インク容器部にインク被検知部材が挿入され、検知用インク

容器部の下部に検知用インク溜部が形成されている構成を有している。

【0009】本発明の請求項4に記載のインクジェット記録装置は、請求項1乃至3の内いずれか1において、光学的検知部材が、キャリッジの位置指標となるホーム位置検知遮光部材の検知も行う構成を有している。

【0010】本発明の請求項5に記載のインクジェット記録装置は、請求項1乃至4の内いずれか1において、インク容器が着脱自在である構成を有している。

【0011】本発明の請求項6に記載のインクジェット記録装置は、請求項1乃至5の内いずれか1において、メイン制御部が、光学的検知部材がインク容器のインク切れ又はインク切れを予め検知する際に、インク切れ又はインク切れを予め表示部又は音声出力部に伝達する告知制御部を備えた構成を有している。

【0012】本発明の請求項7に記載のインクジェット記録装置は、請求項1乃至6の内いずれか1において、遮光部材が、下部に遮光性を有する部位と、遮光部材の上部に透過性を有する部位又は遮光部材の上部に配設された浮動部材が透過性を有する部位と、を備えた構成を有している。

【0013】本発明の請求項8に記載のインクジェット記録装置のインク残量検知方法は、請求項7に記載のインクジェット記録装置において、告知制御部が、遮光部材の遮光性を有する部位が光学的検知部材に検知される位置に下降した際に、インク切れの予告を表示部又は音声出力部により行うインク切れ予告工程と、次に、遮光部材の透過性を有する部位又は遮光部材の上部に配設された透過性を有する浮動部材が下降した際に、インク切れによる印字動作を停止する印字停止工程を、備えた構成を有している。

【0014】ここで、インクとしては、グリセリン等が用いられる。光学的検知部材としては、発光素子が発光ダイオード等、受光素子がフォトダイオード等から構成される透過型フォトインタラプタが用いられる。

【0015】

【作用】この構成によって、インク液層がある程度薄く形成された場合、インクのブラウン運動等により光学的検知部の発光部の光がインク液を通過して受光素子に到達し、光を検知することができるため、インク容器のインク残量をインク容器内に設けたインク被検知部材を用いて、光を遮光された際に、光学的検知部材により光の遮光を検知することができ、信頼性の高いインク残量の検知ができ、又、インクジェット記録装置の構成が容易で、装置の小型化を図ることができる。更に、インク残量の検知時のみ、光学的検知部材の電源を投入させることにより、電力の低下を図ることができる。又、インク容器の下部が、透明の凸形状となる検知用インク溜部を備えたことにより、インクを溜めることができることにより、インクがインク容器壁面に付着乾燥してインクが

遮光性を有することを防止でき、インク検知の信頼性を向上させることができる。更に、インク容器の下部に凸形状に形成した検知用インク溜部は、容易に光学的検知部材間を主走査方向に対して通過することができる構造にでき、インク残量を確実に検知できる。

【００１６】又、浮動部材が、インク比重より軽い発泡体又は中空状に形成されることにより、インク被検知部材がインク上を浮動自在に動くことができ、インク残量に応じたインク量の検知ができる。更に、インク容器が、垂直方向に分離され少なくとも下部において連通する主インク容器部と検知用インク容器部を備え、検知用インク容器部にインク被検知部材が挿入され、検知用インク容器部の下部に凸形状の検知用インク溜部が形成されることにより、インク被検知部材が上下方向に安定して動作でき、精度良くインク残量を検知でき、信頼性を向上させることができる。光学的検知部材が、キャリッジの位置指標となるホーム位置検知遮光部材の検知も行うことにより、装置の小型化及び低原価を実現することができる。又、インク容器が着脱自在であることにより、インク容器の交換やインク容器へのインクの充填が容易であり、保全性を向上させることができる。

【００１７】更に、メイン制御部が、光学的検知部材がインク容器のインク切れ又はインク切れを予め検知する際に、インク切れ又はインク切れを予め表示部又は音声出力部に伝達する告知制御部を備えたことにより、突如のインク切れによる装置の印字不能を防止でき、信頼性を向上させることができる。又、インクの残量が少なくなったことを表示部又は音声出力部に伝達することにより、利用者により確実にインク切れ又はその予告でき、インク切れによる突如の印字不能を防止できる。又、浮動部材の遮光部材が下部に遮光性を有する部位と、遮光部材の上部に透過性を有する部位又は遮光部材の上部に配設された浮動部材が透過性を有する部位と、を備えたことにより、インク切れを予め容易に検知すること及びインク切れを検知することができ、インク切れの予知に対応でき、保全性に優れる。

【００１８】又、告知制御部が、浮動部材の遮光部材の遮光性を有する部位が光学的検知部材に検知される位置に下降した際に、インク切れの予告を表示部又は音声出力部により行うインク切れ予告工程と、次に、遮光部材の透過性を有する部位又は遮光部材の上部に配設された透過性を有する浮動部材が下降した際に、インク切れによる印字動作を停止する印字停止工程を、備えたことにより、装置の保全性，利便性を向上させることができる。

【００１９】

【実施例】以下本発明の一実施例におけるインクジェット記録装置について、図面を参照しながら説明する。

【００２０】（実施例１）図１は本発明の第１実施例におけるインクジェット記録装置の制御系及び駆動系の構

成を示すブロック図である。１はインクジェット装置の制御を行う中央演算処理装置（以下ＣＰＵと称す）、２はインク容器のインクの残量を検知するインク残量検知部、３は記録ヘッドのホーム位置を検知するキャリッジホーム位置検知部、４はパージ動作のホーム位置を検知するパージユニットホーム位置検知部、５は用紙の有無を検知する用紙有無検知部である。６はＣＰＵ１が実行する制御プログラム及び制御データ等の情報が前もって記憶されているＲＯＭ、７はプログラム及びデータ等の一時記憶が行われるＲＡＭである。８はインクの吐出制御を行う記録ヘッド駆動部、９は記録ヘッドを搭載したキャリッジを主走査方向に移動させるキャリッジ駆動部、１０は用紙（記録媒体）を副走査方向に送る用紙送り駆動部、１１は印字ヘッドのクリーニング動作を行うパージユニット駆動部である。１２は前述の各駆動部を動作させるドライバである。さらに、１３はインク残量告知部であり、インク容器内のインクがあるインク残量に達することによりインクジェット記録装置の前面パネルの表示部や、音声発生部により、利用者にインク残量情報を告知する。ここで、キャリッジホーム位置検知部３は、光学的検知部材を用いてホーム位置の検出が行われており、更に、インク残量検知部２も光学的検知部材を用いて電気信号を検知し、ＣＰＵ１への入力信号として送信している。

【００２１】以下に本発明の第１実施例のインクジェット記録装置のインク容器について説明する。図２（ａ）は本発明の第１実施例におけるインクジェット記録装置のインク容器の正断面図であり、図２（ｂ）は図２（ａ）のインク容器の側断面図である。２１はインク容器であり、インク容器上ケース２２及びインク容器下ケース２３から構成されている。２４は主インク容器部、２５は検知用インク容器部であり、インク容器２１内に分離して設けられている。２６はインク容器２１内に充填されたインク、２７はインク容器２１の主インク容器部２４と検知用インク容器部２５を分離するために上面から垂設された仕切り部であり、下部にインク２６が通過するように空隙が設けられている。２８は仕切り部２７に貫通されたインク連通孔であり、これにより、主インク容器部２４と検知用インク容器部２５のインク２６が同一の高さで保持される。２９はフィルターであり、このフィルター２９を通して記録ヘッドにインク２６が供給される。３０は大気連通孔である。更に、３１はインク容器２１の検知用インク容器部２５の下部に設けられた透明の凸形状からなる検知用インク溜部である。３２は検知用インク容器部２５内に挿入された浮動自在のインク被検知部材であり、光を遮光する長方形状の遮光部材３３及び遮光部材３３の上端部に配置され遮光部材３３をインク２６上に浮動させる浮動部材３４から構成される。浮動部材３４は、インク比重より軽い発泡体から形成されている。この浮動部材３４は、少なくともイ

ンク容器２１中に封入されているインク２６より比重が軽く、インク被検知部材３２がインク２６面を浮動自在であればどのような材質でも構わない。例えば、浮動部材３４が中空状に形成され、インク被検知部材３２がインク２６上を浮動するようにしてもよい。又、３５はインクジェット記録装置内に設けられた光学的検知部材であり、発光素子３６と受光素子３７からなり、検知用インク容器部２５の下部の検知用インク溜部３１が、発光素子３６と受光素子３７の間を通過するように配置される。

【００２２】以上のように構成された本実施例のインクジェット記録装置のインク容器のインク残量検知方法について、以下に図を用いて説明する。図３は本発明の第１実施例におけるインクジェット記録装置のインク残量の光学的検知の動作を示す一部破断要部斜視図である。２１はインク容器、２６はインク、３１は検知用インク溜部、３２はインク被検知部材、３３は遮光部材、３４は浮動部材、３５は光学的検知部材、３６は発光素子、３７は受光素子であり、又、３８はインク容器２１によりインク２６を供給され印字を行う記録ヘッド、３９は記録ヘッド３８及びインク容器２１を搭載するキャリッジ、４０はキャリッジ３９を図３の矢印Ａで示す主走査方向に摺動させるためのキャリッジシャフトである。

【００２３】まず、印字動作により、インクジェット記録装置のインク容器２１内のインク２６は、フィルター２９を通して吸収，消費されるに従って、主インク容器部２４及びインク連通孔２８で結ばれた検知用インク容器部２５のインク２６面が徐々に下がってくる。すると、検知用インク容器部２５内にある遮光部材３３及び浮動部材３４からなるインク被検知部材３２が、インク２６面の高さに応じて徐々に下がてくる。インク２６の残量がある高さになると遮光部材３３はインク容器２１の透過性を有する検知用インク溜部３１に下がってくる。すると、検知用インク溜部３１は、遮光部材３３により透過性を失う。ここで、光学的検知部材３５の発光素子３６から発光される光は、検知用インク溜部３１が光学的検知部材３５を通過する際に遮光部材３３により光が透過せず、光学的検知部材３５の受光素子３７へは光が到達しなくなる。このことにより、ＣＰＵ１はインク２６の残量が少なくなったこと又はインク２６が消費されたことを検知できる。すなわち、図３において、インク容器２１を搭載したキャリッジ３９が、主走査方向へ移動する。この際、インク容器２１の検知用インク溜部３１を鉛直方向から挟んで互いに対向配置された発光素子３６及び受光素子３７の間を通過することで、検知用インク溜部３１の状態が、透過又は遮光のいずれの状態にあるのかを検知することになる。ここで、光学的検知部材３５は、キャリッジ３９のホーム位置指標となるキャリッジホーム位置検知用遮光部材の検知も行う。

【００２４】以上のように本実施例によれば、インク液層がある程度薄い場合、インク２６のブラウン運動等により光学的検知部の発光部の光がインク液を通過して受光素子３７に到達し、光を検知することができるため、インク容器２１のインク残量をインク容器２１内に設けたインク被検知部材３２を用いて、光学的検知部材３５により検知することができ、信頼性の高いインク残量の検知ができ、又、インクジェット記録装置の構成が容易で、装置の小型化を図ることができる。又、インク容器２１の下部が、透明の凸形状となる検知用インク溜部３１を備えたことにより、インク２６を溜めることができることにより、インク２６がインク容器壁面に付着乾燥してインク２６が遮光性を有することを防止でき、インク検知の信頼性を向上させることができる。更に、インク容器２１の下部に凸形状に形成した検知用インク溜部３１により、容易に光学的検知部材３５間を通過することができるとともに、インク残量を確実に検知できる。

【００２５】（実施例２）以下に本発明の第２実施例のインクジェット記録装置について説明する。図４は本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えた光学的検知の動作を示す要部斜視図である。図４におけるインクジェット記録装置は、カラー印字可能な４色のインク容器を有するシリアルタイプの記録装置である。又、図５は本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えた操作パネルの平面模式図であり、図６は本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えたインク残量検知のタイミングチャートであり、図７は本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えたインク残量検知方法を示すフローチャートである。図４において、２１ａ，２１ｂ，２１ｃ，２１ｄは各インクの色が異なるインク容器であるインクＡ用インク容器，インクＢ用インク容器，インクＣ用インク容器，インクＤ用インク容器、３５は透過型フォトインタラプタからなる光学的検知部材である。３８は各インク容器２１ａ，２１ｂ，２１ｃ，２１ｄに対応しインク容器に接続される記録ヘッド、３９は各インク容器２１ａ，２１ｂ，２１ｃ，２１ｄ及び記録ヘッド３８を搭載したキャリッジ、４０はキャリッジ３９を主走査方向に摺動させるためのキャリッジシャフトであり、キャリッジシャフト４０とキャリッジ３９は、摺動部材で連結されている。４１はキャリッジガイドプレート、４２はキャリッジ３９のホーム位置検知用のキャリッジホーム検知用遮光部材であり、光学的検知部材３５を通過することにより、ホーム位置が検知される。４３はキャリッジ３９を摺動する駆動力を発生するキャリッジモーターである。又、４４はタイミングベルトであり、キャリッジモーター４３の駆動力により回転され、キャリッジ３９を主走査方向に移動させる。又、４５はインク２６による記録が行われる記録媒体である。ここで、キャリッジ３９にはタイミングベルト４４が固

定されており、このタイミングベルト４４をキャリッジモーター４３で回転摺動させることによりキャリッジ３９は、主走査方向へ移動が可能となる。このキャリッジ３９には、キャリッジホーム検知用遮光部材４２が設けられている。

【００２６】図５において、４６はインクジェット記録装置の操作パネル、４７ａ，４７ｂ，４７ｃ，４７ｄは各インク容器２１ａ，２１ｂ，２１ｃ，２１ｄに対応したインク切れを示すインクエンプティブＬＥＤである。又、キャリッジ３９上には記録ヘッド３８、インクＡ用インク容器２１ａ、インクＢ用インク容器２１ｂ、インクＣ用インク容器２２ｃ、インクＤ用インク容器２２ｄが搭載されている。

【００２７】図６において、キャリッジホーム位置は常に光学的検知部材３５を遮光するため常に検知され、各インク容器２１ａ，２１ｂ，２１ｃ，２１ｄに対しては、インク切れが生じた場合にのみ、光学的検知部材３５が遮光され、検知信号が得られる。このタイミングは、図６に示すように各インク容器を搭載したキャリッジ３９の主走査方向の移動速度と、各インク容器の配置位置に対して、ある所定の間隔をおいて検知される。この検知信号は、ラッチ回路等に保持され、例えば図７のフローチャートに従って、各インク容器のインク切れが検知される。この時、インク切れを検知した場合、この検知信号をＣＰＵ１で処理した後、操作パネル４６上に設けられているインクエンプティブＬＥＤ４７，４７ｂ，４７ｃ，４７ｄをインク色に応じて点灯させることができる。

【００２８】以上のように本実施例によれば、カラー印字に対応したインクジェット記録装置において、インク残量の検知をキャリッジホーム検知用遮光部材の検知と共用することにより、装置の構成が容易に、インク残量を検知でき、小型化を図ることができる。

【００２９】ここで、浮動部材の遮光部材が下部に遮光性を有する部位と、遮光部材の上部に透過性を有する部位とに構成することにより、インク切れを予め容易に検知すること及びインク切れを検知することができ、インク切れの予知に対応でき、保全性に優れる。更に、インクジェット記録装置のメイン制御部（図示せず）が、光学的検知部材がインク容器のインク切れ又はインク切れを予め検知する際に、インク切れ又はインク切れを予め表示部又は音声出力部に伝達する告知制御部を備えることにより、突如のインク切れによる装置の印字不能を防止でき、信頼性を向上させることができる。又、インク残量が少なくなったことを表示部又は音声出力部に伝達することにより、利用者に確実にインク切れ又はその予告でき、インク切れによる突如の印字不能を防止できる。この際、メイン制御部に設けられた告知制御部が、遮光部材の遮光性を有する部位が光学的検知部材に検知される位置に下降した際に、インク切れの予告を表示部

又は音声出力部により行うインク切れ予告工程と、次に、遮光部材の透過性を有する部位又は遮光部材の上部に配設された透過性を有する浮動部材が下降した際に、インク切れによる印字動作を停止する印字停止工程を、備えることにより、装置の保全性、利便性を向上させることができる。

【００３０】

【発明の効果】以上のように本発明は、簡単な構造でインクの残量を確実に検知でき、光学的検知部材が、キャリッジの位置指標となるキャリッジホーム検知用遮光部材の検知も行うことにより、機械及び電気部品の数少なく、構成が容易になり、小型化、軽量化が可能な低原価で信頼性，量産性に優れたインクジェット記録装置を実現することができる。特に、インク容器が、垂直方向に分離され少なくとも下部において連通する主インク容器部と検知用インク容器部を備え、検知用インク容器部にインク被検知部材が挿入され、検知用インク容器部の下部に凸形状の検知用インク溜部が形成されることにより、インク被検知部が上下方向に安定して動作でき、精度良くインク残量を検知でき、信頼性に優れたインクジェット記録装置を実現することができる。又、インク容器が着脱自在であることにより、インク容器の交換やインク容器へのインクの充填が容易であり、保全性を向上させることができる。又、浮動部材が、インク比重より軽い発泡体又は中空状に形成され、インク被検知部材がインク上を浮動自在に動くことにより、インク残量に応じたインク量の検知ができ、保全性に優れたインクジェット記録装置を実現することができる。

【００３１】更に、メイン制御部が、光学的検知部材がインク容器のインク切れ又はインク切れを予め検知する際に、インク切れ又はインク切れを予め表示部又は音声出力部に伝達する告知制御部を備えたことにより、突如のインク切れによる装置の印字不能を防止でき、保全性に優れたインクジェット記録装置を実現できる。又、インクの残量が少なくなったことを表示部又は音声出力部に伝達することにより、利用者に確実にインク切れ又はその予告でき、インク切れによる突如の印字不能を防止でき、信頼性に優れたインクジェット記録装置を実現することができる。又、浮動部材の遮光部材が下部に遮光性を有する部位と、遮光部材の上部に透過性を有する部位又は遮光部材の上部に配設された浮動部材が透過性を有する部位と、を備えたことにより、インク切れを予め容易に検知すること及びインク切れを検知することができ、インク切れに対応でき、保全性に優れたインクジェット記録装置を実現することができる。

【００３２】又、告知制御部が、浮動部材の遮光部材の遮光性を有する部位が光学的検知部材に検知される位置に下降した際に、インク切れの予告を表示部又は音声出力部により行うインク切れ予告工程と、次に、遮光部材の透過性を有する部位又は遮光部材の上部に配設された

透過性を有する浮動部材が下降した際に、インク切れによる印字動作を停止する印字停止工程を、備えたことにより、装置の保全性，利便性に優れたインクジェット記録装置のインク残量検知方法を実現することができる。

【図面の簡単な説明】

【図１】本発明の第１実施例におけるインクジェット記録装置の制御系及び駆動系の構成を示すブロック図

【図２】（ａ）本発明の第１実施例におけるインクジェット記録装置のインク容器の正断面図

（ｂ）本発明の第１実施例におけるインクジェット記録装置のインク容器の側断面図

【図３】本発明の第１実施例におけるインクジェット記録装置のインク残量の光学的検知の動作を示す一部破断要部斜視図

【図４】本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えた光学的検知の動作を示す要部斜視図

【図５】本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えた操作パネルの平面模式図

【図６】本発明の第２実施例におけるインクジェット記録装置のカラー用インクを備えたインク残量検知のタイミングチャート

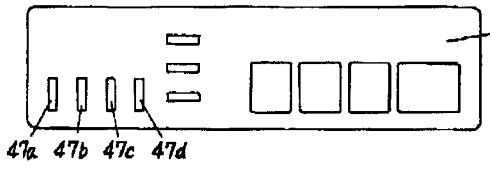
【図７】本発明の第２実施例におけるインクジェット記録装置のカラー印字用インクを備えたインク有無検知の方法を示すフローチャート

【符号の説明】

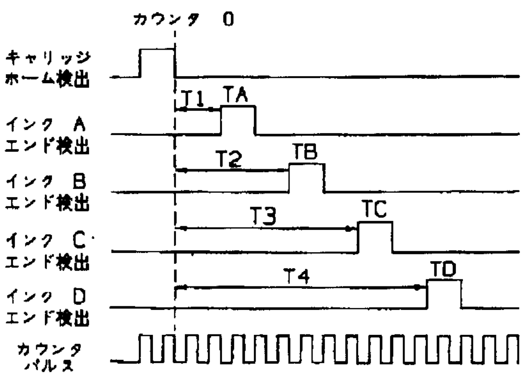
１　中央演算処理装置（ＣＰＵ）
２　インク残量検知部
３　キャリッジホーム位置検知部
４　パージユニットホーム位置検知部
５　用紙検知部
６　ＲＯＭ
７　ＲＡＭ

８　印字ヘッド駆動部
９　キャリッジ駆動部
１０　用紙送り駆動部
１１　パージユニット駆動部
１２　ドライバ
１３　インク残量告知部
２１，２１ａ，２１ｂ，２１ｃ，２１ｄ　インク容器
２２　インク容器上ケース
２３　インク容器下ケース
２４　主インク容器部
２５　検知用インク容器部
２６　インク
２７　仕切り部
２８　インク連通孔
２９　フィルター
３０　大気連通孔
３１　検知用インク溜部
３２　インク被検知部材
３３　遮光部材
３４　浮動部材
３５　光学的検知部材
３６　発光素子
３７　受光素子
３８　記録ヘッド
３９　キャリッジ
４０　キャリッジシャフト
４１　キャリッジガイドプレート
４２　キャリッジホーム検知用遮光部材
４３　キャリッジモーター
４４　タイミングベルト
４５　記録媒体
４６　操作パネル
４７ａ，４７ｂ，４７ｃ，４７ｄ　インクエンプティブＬＥＤ

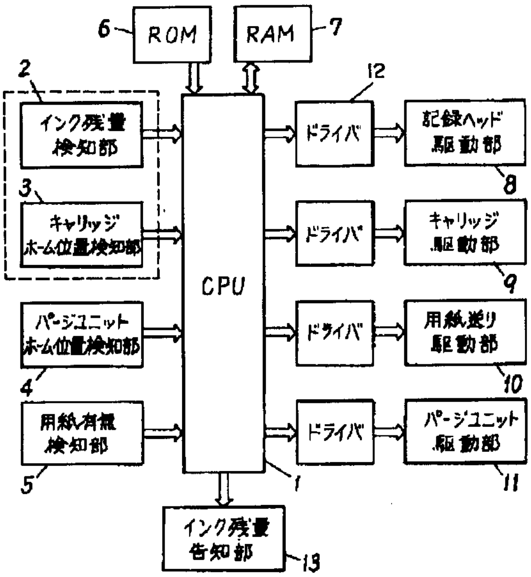
【図５】



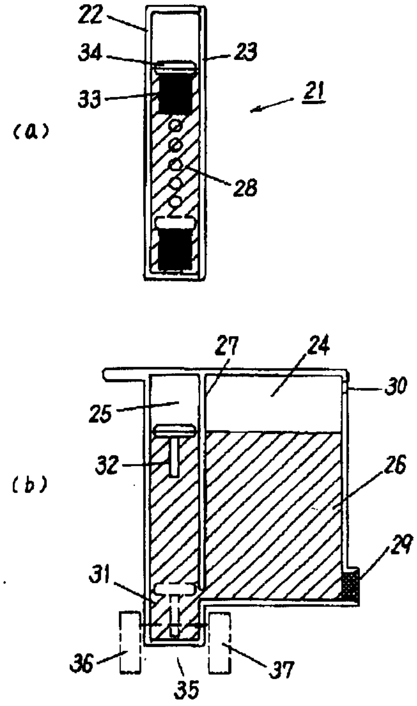
【図６】



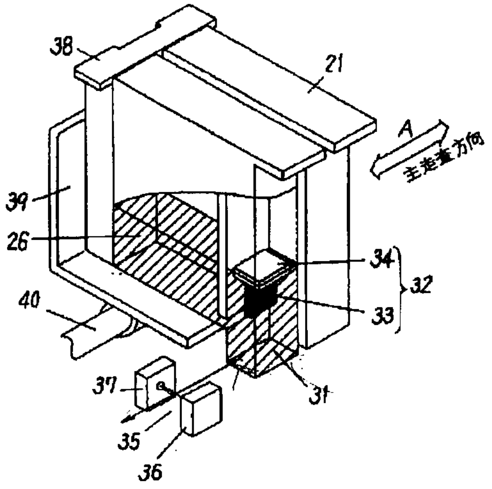
【図1】


ROM
RAM
6
7
2
12
インク残量検知部
3
キャリッジホーム位置検知部
パージユニットホーム位置検知部
4
用紙有無検知部
5
CPU
1
ドライバ
記録ヘッド駆動部
8
キャリッジ駆動部
9
用紙送り駆動部
10
パージユニット駆動部
11
インク残量告知部
13

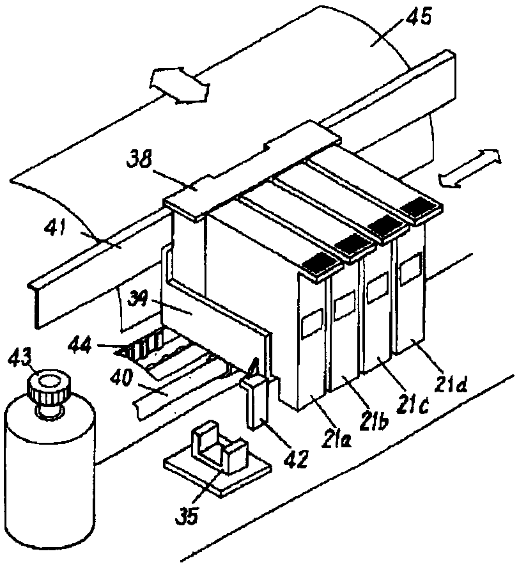
【図2】


(a)
(b)
22
34
33
23
21
28
27
24
25
30
32
26
29
31
36
35
37

【図3】


38
21
A
主走査方向
39
26
34
32
33
40
37
31
35
36

【図4】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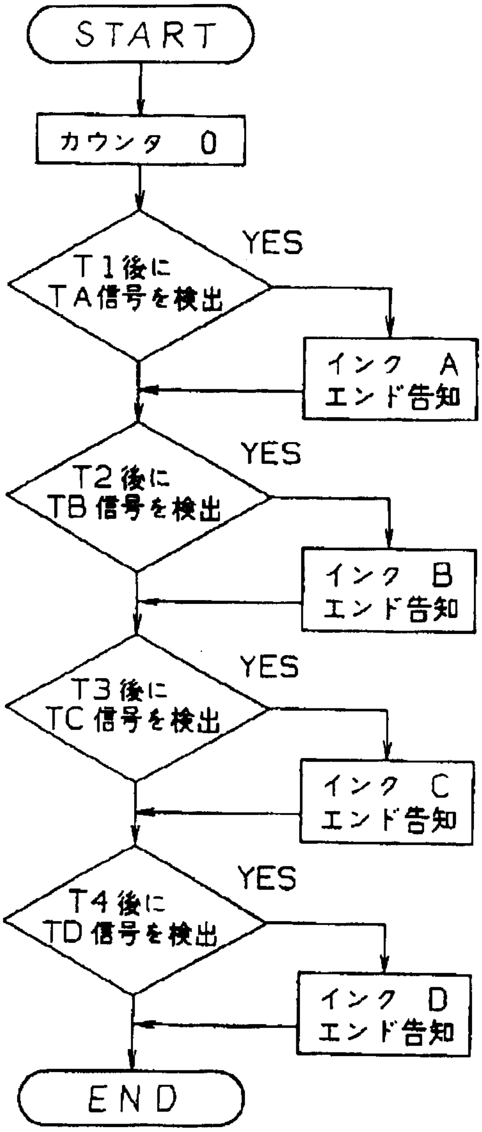
38
41
39
43
44
40
42
35
21a
21b
21c
21d

【図7】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T1後に
TA信号を検出
YES
インク A
エンド告知
T2後に
TB信号を検出
YES
インク B
エンド告知
T3後に
TC信号を検出
YES
インク C
エンド告知
T4後に
TD信号を検出
YES
インク D
エンド告知
END

Doc Code: PET.SPRE.ACX

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PETITION TO MAKE SPECIAL UNDER ACCELERATED EXAMINATION PROGRAM

Attorney Docket Number	076376.0411	First Named Inventor	TOYONORI SASAKI
Application Number (if Known)			
Title of Invention	INK CARTRIDGES		

APPLICANT HEREBY PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE REVISED ACCELERATED EXAMINATION PROGRAM. See Instruction sheet on page 3.

1. **Claims of the application:**
   a. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims.

   b. **Applicant hereby agrees not to separately argue the patentability of any dependent claim during any appeal** in the application. Specifically, the applicant agrees that the dependent claims will be grouped together with and not argued separately from the independent claim from which they depend in any appeal brief filed in the application (37 CFR 41.37(c)(1)(vii)).

   c. The claims must be directed to **a single invention**.

2. **Interviews:**
   Applicant hereby agrees to have (if requested by examiner):
   a. An interview (including an interview before a first Office action) to discuss the prior art and any potential rejections or objections with the intention of clarifying and possibly resolving all issues with respect to patentability at that time, and

   b. A telephonic interview to make an election without traverse if the Office determines that the claims are not obviously directed to a single invention.

3. **Preexamination Search Statement and Accelerated Examination Support Document:**
   With this petition, applicant is providing: a **preexamination search statement**, in compliance with the requirements set forth in item 8 of the instruction sheet, and an **"accelerated examination support document"** that includes:
   a. An **information disclosure statement** in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the independent claims;

   b. For each reference cited, **an identification of all the limitations of the claims** that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;

   c. A **detailed explanation of how each of the claims are patentable** over the references cited with the particularity required by 37 CFR 1.111(b) and (c);

   d. A concise **statement of the utility** of the invention as defined in each of the independent claims (unless the application is a design application);

   e. An identification of any cited references that may be disqualified as prior art under 35 U.S.C. 103(c) as amended by the CREATE act; and

   f. **A showing of where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112** in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6; and (2) the structure, material, or acts that correspond to any means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6. If the application claims the benefit of one or more applications under title 35, United St ates Code, the showing must also include where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112 in each such application in which such support exists.

The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This form is estimated to take 12 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. *If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*
EFS Web 1.0

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PETITION TO MAKE SPECIAL UNDER ACCELERATED EXAMINATION PROGRAM (Continued)

Attorney Docket Number	076376.0411	First Named Inventor	TOYONORI SASAKI

Attachments:

a.		Accelerated Examination Support Document (see item 3 above).
b.		A statement, in compliance with the requirements set forth in item 8 of the instruction sheet, detailing the preexamination search which was conducted.
c.		Information Disclosure Statement.
d.	☐	Other (*e.g.*, a statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism (37 CFR 1.102(c)(2))

Fees: The following fees must be filed electronically via EFS or EFS-Web:

a.	The basic filing fee, search fee, examination fee, and application size fee (if required) under 37 CFR 1.16.
b.	Petition fee under 37 CFR 1.17(h) - unless the petition is filed with a showing under 37 CFR 1.102(c)(2).

Signature:

Click Remove if you wish to remove this signatory   Remove

Signature	/Timothy J. Churna/	Date	2006-09-29
Name (Print/Typed)	Timothy J. Churna	Registration Number	48340

Click Add if you wish to add additional signatory   Add

***Note**: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.*

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Instruction Sheet Petition to Make Special Under the Accelerated Examination

A grantable petition must meet the following conditions:

1. The petition to make special under the accelerated examination program must be filed with the application and accompanied by the fee set forth in 37 CFR 1.17(h) or a statement that the claimed subject matter is directed to environmental quality, energy, or countering terrorism.

2. The application must be a non-reissue utility or design application filed under 35 U.S.C. 111(a).

3. The application must be **filed electronically** using the Office electronic filing system (EFS) or EFS-Web.

4. The application must be complete under 37 CFR 1.51 and in condition for examination on filing. For example, the application must be filed together with the basic filing fee, search fee, examination fee, and application size fee (if applicable), and an oath or declaration under 37 CFR 1.63.

5. The application must contain three (3) or fewer independent claims and twenty (20) or fewer total claims. The application may not contain any multiple dependent claims. The petition must include a statement that **applicant will agree not to separately argue the patentability of any dependent claim during any appeal** in the application. Specifically, the applicant is agreeing that the dependent claims will be grouped together with and not argued separately from the independent claim from which they depend in any appeal brief filed in the application (37 CFR 41.37(c)(1)(vii)).

6. The claims must be directed to a **single invention**. The petition must include a statement that applicant will agree to have a telephonic interview to make an election without traverse in a telephonic interview if the Office determines that all the claims are not directed to a single invention.

7. The petition must include a statement that **applicant will agree** to have an interview (including an interview before a first Office action) to discuss the prior art and any potential rejections or objections with the intention of clarifying and possibly resolving all issues with respect to patentability at that time.

8. At the time of filing, applicant must provide a statement that a **preexamination search was conducted**, including an identification of the field of search by United States class and subclass and the date of the search, where applicable, and, for database searches, the search logic or chemical structure or sequence used as a query, the name of the file or files searched and the database service, and the date of the search.
   a. This preexamination search must involve U.S. patents and patent application publications, foreign patent documents, and nonpatent literature, unless the applicant can justify with reasonable certainty that no references more pertinent than those already identified are likely to be found in the eliminated source and includes such a justification with this statement.
   b. This preexamination search must be directed to the claimed invention and encompass all of the features of the independent claims, giving the claims the broadest reasonable interpretation.
   c. The preexamination search must also encompass the disclosed features that may be claimed, in that an amendment to the claims (including any new claim) that is not encompassed by the preexamination search will be treated as non-responsive and will not be entered.
   d. A search report from a foreign patent office will not be accepted unless the search report satisfies the requirements set forth above.
   e. Any statement in support of a petition to make special must be based on a good faith belief that the preexamination search was conducted in compliance with these requirement. See 37 CFR 1.56 and 10.18.

9. At the time of filing, applicant must provide in support of the petition an **accelerated examination support document that includes:**
   a. An **information disclosure statement** in compliance with 37 CFR 1.98 citing each reference deemed most closely related to the subject matter of each of the claims;
   b. For each reference cited, **an identification of all the limitations of the claims** that are disclosed by the reference specifying where the limitation is disclosed in the cited reference;
   c. A **detailed explanation of how each of the claims are patentable** over the references cited with the particularity required by 37 CFR 1.111(b) and (c);
   d. A concise **statement of the utility** of the invention as defined in each of the independent claims (unless the application is a design application);
   e. An identification of any cited references that may be disqualified as prior art under 35 U.S.C. 103(c) as am ende d by the CREATE act; and
   f. A **showing of where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112** in the written description of the specification. If applicable, the showing must also identify: (1) each means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6; and (2) the structure, material, or acts that correspond to any means- (or step-) plus-function claim element that invokes consideration under 35 U.S.C. 112, ¶6. If the application claims the benefit of one or more applications under title 35, United States Code, the showing must also include where each limitation of the claims finds support under the first paragraph of 35 U.S.C. 112 in each such application in which such support exists.

For more information, see notice "Changes to Practice for Petitions in Patent Applications to Make Special and for Accelerated Examination" available on the USPTO web site at http://www.uspto.gov/web/office s/pac/dapp/ogsheet.html

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about indivi duals.

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